Space Weather Forecast

Issued on Tuesday, 16 July 2024 at 13:11 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate-class X-ray flares likely (R1-R2 radio blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate, with the largest flare occurring at 16/0737 UTC, originating from a smaller region in the northwest. This region is in an inherently unstable somewhat north-south magnetically aligned configuration, however. There are now up to seventeen sunspot regions on the visible disc. The largest and most complex region is now approaching the western limb. It is getting difficult to assess as it approaches the limb, but appears to remain magnetically complex. The next largest region is in the southeast. This spot continues to develop, gaining penumbra and now with magnetic complexity evident here. A further region in the southwest has a somewhat complex magnetic structure, with flux emergence to the rear of the trailing spots. Several other regions have been showing recent growth, but are largely magnetically simple at present.
Despite the number of sunspot regions, no Earth-directed Coronal Mass Ejections (CMEs) have been observed.

Solar Wind / Geomagnetic Activity: The solar wind showed a CME arrival around 15/2150 UTC. Wind speed was at background levels throughout, but rose slightly after the CME arrival to around 360 km/s. The interplanetary magnetic field was initially weak, becoming moderate from 15/2150UTC, before increasing to be mostly strong between 16/0330-1000 UTC. The north-south variation was also varied weakly initially, becoming moderately southward directed after the CME arrival, then becoming moderately northward directed after 16/0200 UTC.
Geomagnetic activity was Quiet to Unsettled (Kp 1-3), with an Active (Kp 4) interval 16/0000-0300 UTC.

Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Further Moderate-class flares are likely, with a slight chance of isolated Strong flares, most likely from either of the two larger regions on the disc. This risk reducing through the second half of the period as one of these regions leaves the facing side of the Sun.

Solar Wind /Geomagnetic Activity: Earth currently appears to be experiencing the effects of a weak CME, but no other Earth directed CMEs are currently expected. The only other potential enhancement is a coronal hole fast wind later in the period, but this is low confidence and solar winds are most likely to remain near background levels. Geomagnetic activity is expected to be mostly Quiet to Unsettled, with a slight chance of Active or G1/Minor storms on day 1 (16 Jul) due to the ongoing CME effects, then again on days 3 and 4 (18-19 Jul) should there be any fast wind enhancement.

Energetic Particles / Solar Radiation: Solar radiation storms are unlikely, with a slight chance of rising above the S1/Minor Storm threshold in response to any notable flares, mainly from the large off-going sunspot.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	1	10	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	60	60
Very Active	R3 to R5 X	No	10	10	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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